(12) UK Patent Application (19) GB (11) 2 215 260 (13) A

(43) Date of A publication 20.09.1989

(21) Application No 8804955.6

(22) Date of filing 02.03.1988

(51) INT CL⁴
B25J 21/02

(52) UK CL (Edition J)
B4Q Q9

(56) Documents cited
GB 2109921 A GB 1562042 A GB 1530867 A
GB 1502885 A GB 1327304 A GB 1326604 A
GB 1325763 A GB 1118657 A EP 0030565 A1
WO 86/03444 A1

(58) Field of search
UK CL (Edition J) B4Q, F4X
INT CL⁴ B08B, B25J, G21F

(71) Applicant
Vista Optics Limited

(Incorporated in the United Kingdom)

Vista House, 10-12 Larkstore Park, Lodge Road, Staplehurst, Tonbridge, Kent, TN12 0QY, United Kingdom

(72) Inventor
Alexander Grant Boyd

(74) Agent and/or Address for Service
W H Beck Greener & Co
7, Stone Buildings, Lincoln's Inn, London, WC2A 3SZ, United Kingdom

(54) Structure for creating a laminar-flow environment and a method of use

(57) A structure (1) for the creation of a laminar-flow environment has a wall (2) bounding a laterally elongate flow path for a gaseous environment, a generator (3) at one end of the flow path for creating a laminar flow of the gaseous environment along the flow path, and ports (5) in the wall permitting entry of manipulators, such as the hand and part at least of the arm of an operative, transversely into the flow path such that the gas flow passes in laminar-flow manner laterally past the manipulators during the carrying out of an operation within the gas flow. The structure can be used for the aseptic insertion of powder into a container and optionally adding of solute to the powder in the container.

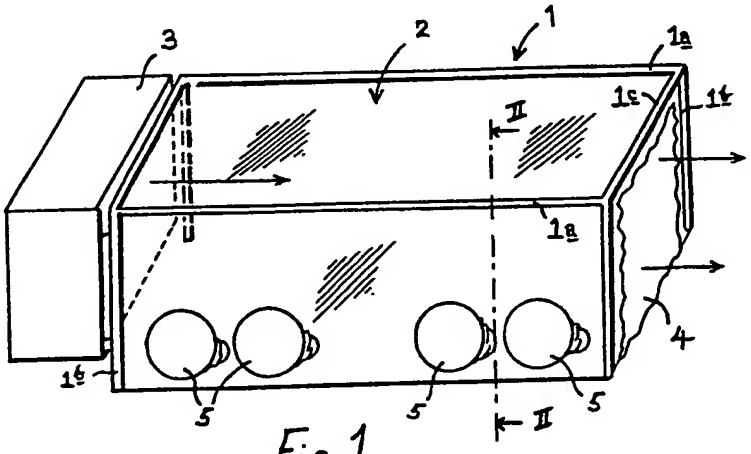

Fig.1

GB 2 215 260 A

2215260

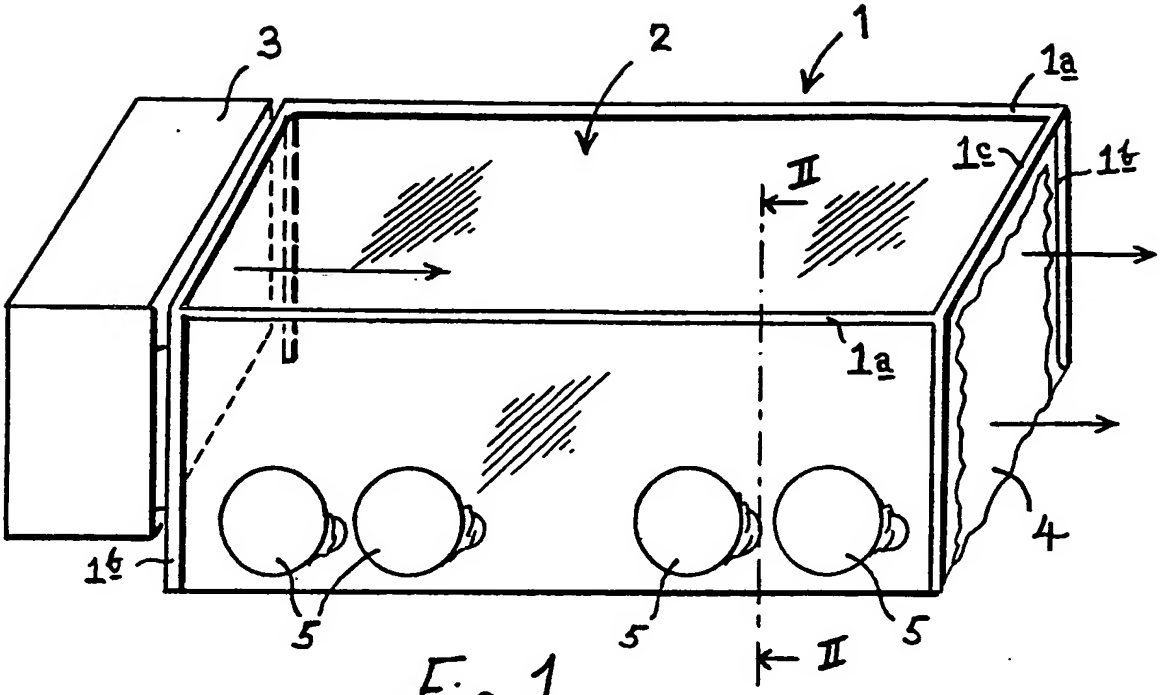

Fig. 1

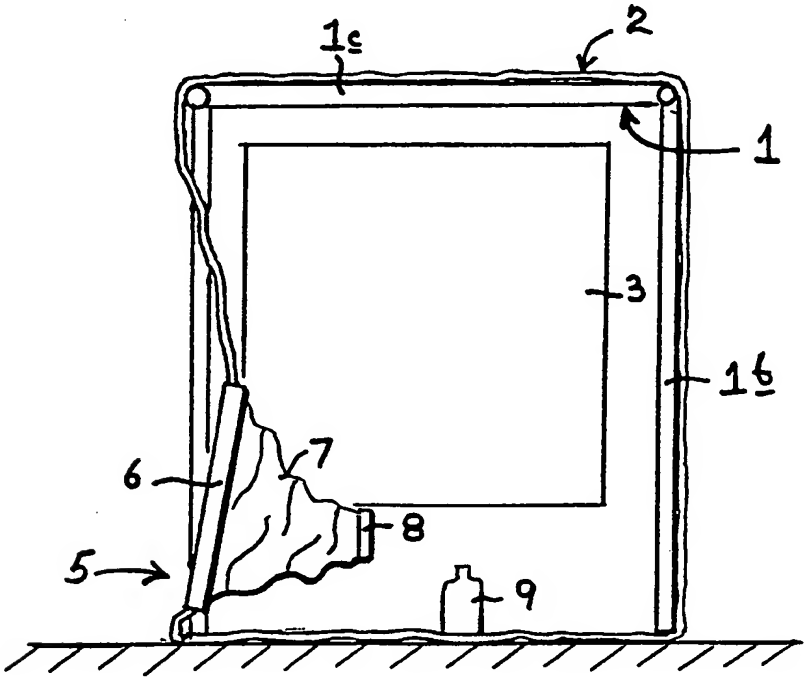

Fig. 2

STRUCTURE FOR CREATING A LAMINAR-FLOW ENVIRONMENT AND A METHOD OF USE

This invention relates to a structure for creating a laminar-flow of a gaseous environment and, whilst not restricted to such use, is of particular advantage in the aseptic handling of light powders.

The object of the invention is to provide a structure which creates a laminar-flow of environmental gas, such as sterile air, which passes in a flow path which is lateral to a manipulator, e.g. a human operative, whereby in particular it is possible to dispose a plurality of work stations serially along a common flow path.

According to the present invention, a structure, for creating a laminar-flow environment, comprises wall means bounding a laterally elongate flow path for a gaseous environment, means at an end of said flow path for creating a laminar-flow of the gaseous environment along said flow path, and port means in said wall means for entry of manipulators transversely into the flow path such that the gas flow passes in laminar-flow lateral manner past the manipulators.

The port means may comprise a sleeve for entry of at least a portion of the arm of an operative, and in a preferred embodiment there are a plurality of pairs of

ports disposed serially in the wall means along the direction gas flow, to provide a corresponding plurality of work stations for operatives.

The wall means is advantageously at least partially formed of flexible transparent sheet material, and a conveniently light and portable unit has a frame and an enclosure of transparent sheet material supported on said frame.

A laminar airflow generator may be mounted on said frame and arranged to create a laminar flow along an elongate flow path bounded by said enclousre.

The other end of said elongate flow path may be open to atmosphere.

In an example of construction for totally aseptic working, the port means is a flexible sleeve terminating in a glove and adapted to receive the hand and at least a portion of the arm of an operative completely sealed off from the gaseous environment of the flow path.

Further, according to the invention, a method for the aseptic insertion of powder into a container comprising steps of placing a container and a quantity of powder within an enclosure having a plurality of ports extending into the enclosure for manipulators to handle the powder, creating within the enclosure an elongate path of laminar flow of gaseous environment

laterally past the ports and the container, and manipulating powder into the container whilst in said laminar flow. Advantageously, a plurality of operatives are positioned at a plurality of work stations disposed at intervals along the path of flow to manipulate powder into respective containers.

In a further step, whilst the container is still within the laminar flow of gaseous environment, a solute may be added to powder in the container.

In order that the nature of the invention may be readily ascertained, an embodiment of laminar-flow environment structure, and a method of operation utilising the same, are hereinafter particularly described with reference to the accompanying drawing, wherein:

Fig. 1 is a front perspective elevation of an environment structure;

Fig. 2 is a sectional elevation taken on the line II-II of Fig. 1.

Referring to the drawing, an environment structure comprises a paralellepipedal frame 1, made for example of metal tubing, consisting of longitudinal members 1a, vertical members 1b, and transverse members 1c. About the whole of the frame 1, with the exceptions of the two ends of the frame, is disposed a tubular wall 2 of plastics sheeting. The upper and front and back

portions of the wall 2 are made of fully transparent sheeting, whereas the base wall may be made of a contrasting opaque sheeting for ease of use as a worktop.

In an alternative form of construction, the base portion of the wall 2 is omitted, and the tubular wall 2 is then in the form of an inverted U-channel which is hung from the frame 1. The whole is placed on any suitable flat supporting surface, and the lower edge of the side wall portions may be extended by a flange to lie flat in an air-tight manner on the supporting surface.

At one end of the frame 1 there is mounted a conventional laminar airflow generator 3 arranged to generate a flow of air in the direction of the arrows along the path bounded by the tubular wall 2. The generator 3 would include a HEPA (High Efficiency Particulate Air) filter.

The other end 4 of the path bounded by the tubular wall 2 is open to atmosphere.

The front portion of the tubular wall 2 includes along its length four manual operator ports 5, the construction of which is seen in greater detail in Fig. 2. Each port has a rigid circular rim 6 serving for the airtight connection of a flexible sleeve 7 terminating in a cuff portion 8 adapted to seat about

the wrist of an operative who is positioned facing the front wall and has both arms passed through a respective one of the ports 5, leaving the hands free within the enclosure for carrying out an operation within the laminar-flow environment thus created.

For ease of illustration only two pairs of ports 5 are shown, but it will be apparent that the structure could be made longer than shown and could accommodate any number of pairs of ports 5 within practical limits.

In use, the generator 3 creates a gentle laminar flow of cleaned air along the flow path and out of the open end 4. As the flow of air is laminar, there is substantially no turbulence within the environment structure, and operations involving the handling of light materials, such as powders, can be carried out in a clean atmosphere without risk of disturbance of the light materials by air currents and eddies.

By way of example, the structure is of particular advantage in the carrying out of aseptic filling of containers with light materials, such as powders. One common form of such operation is the measuring out of a desired quantity of a powder, insertion of that measured quantity into a container such as a bottle 9, and the addition of a solute to the container to provide a solution, whereafter the container is sealed.

CLAIMS

1. A structure for creating a laminar-flow environment, comprising wall means bounding a laterally elongate flow path for a gaseous environment, means at an end of said flow path for creating a laminar flow of the gaseous environment along said flow path, and port means in said wall means for entry of manipulators transversely into the flow path such that the gas flow passes in laminar-flow lateral manner past the manipulators.

2. A structure as claimed in Claim 1, wherein the port means comprise a flexible sleeve for entry of at least a portion of the arm of an operative.

3. A structure, as claimed in Claim 2, wherein the flexible sleeve terminates in a glove.

4. A structure as claimed in any one of the preceding claims, having a plurality of pairs of ports disposed serially in the wall means along the direction of gas flow, to provide a corresponding plurality of work stations for operatives.

5. A structure as claimed in any one of the preceding claims, wherein the wall means is at least partially formed of flexible transparent sheet material.

6. A structure as claimed in Claim 5, comprising a frame and an enclosure of transparent sheet material supported on said frame.

7. A structure as claimed in Claim 6, comprising a laminar airflow generator mounted on said frame and arranged to create a laminar flow along an elongate flow path bounded by said enclosure.

8. A structure, as claimed in any one of the preceding claims, wherein the other end of said elongate flow path is open to atmosphere.

9. A method for the aseptic insertion of powder into a container comprising steps of placing a container and a quantity of powder within an enclosure having a plurality of ports extending into the enclosure for manipulators to handle the powder, creating within the enclosure an elongate path of laminar flow of gaseous environment laterally past the ports and the container, and manipulating powder into the container whilst in said laminar flow.

10. A method as claimed in Claim 9, wherein a plurality of operatives at a plurality of work stations disposed at intervals along the path of flow manipulate powder into respective containers.

11. A method for the aseptic creation of solution in containers comprising carrying out a method as claimed in Claim 9 or Claim 10 and, whilst the container is still within the laminar flow of gaseous environment, adding a solute to powder in the container.

12. A structure for creating a laminar-flow environment substantially as described herein with reference to the accompanying drawings.

13. A method for the aseptic insertion of powder into a container substantially as described herein with reference to the accompanying drawings.

14. A method for the aseptic creation of solution in containers substantially as described herein with reference to the accompanying drawings.

Amendments to the claims
have been filed as follows

1. A structure for creating a laminar-flow environment, comprising wall means bounding a laterally elongate flow path for a gaseous environment, the outlet end of said flow path being open to atmosphere; means at the inlet end of said flow path for creating a laminar flow of the gaseous environment along said flow path; and port means in said wall means for entry of manipulators transversely into the flow path such that the gas flow passes in laminar-flow lateral manner past the manipulators.

2. A structure as claimed in Claim 1, wherein the port means comprise a flexible sleeve for entry of at least a portion of the arm of an operative.

3. A structure, as claimed in Claim 2, wherein the flexible sleeve terminates in a glove.

4. A structure as claimed in any one of the preceding claims, having a plurality of pairs of ports disposed serially in the wall means along the direction of gas flow, to provide a corresponding plurality of work stations for operatives.

5. A structure as claimed in any one of the preceding claims, wherein the wall means is at least partially formed of flexible transparent sheet material.

6. A structure as claimed in Claim 5, comprising a frame and an enclosure of transparent sheet material supported on said frame.

7. A structure as claimed in Claim 6, comprising a laminar airflow generator mounted on said frame and arranged to create a laminar flow along an elongate flow path bounded by said enclosure.

8. A method for the aseptic insertion of powder into a container comprising steps of placing a container and a quantity of powder within an enclosure open at one end and having a plurality of ports extending into the enclosure for manipulators to handle the powder, creating within the enclosure an elongate path of laminar flow of gaseous environment laterally past the ports and the container towards said open end, and manipulating powder into the container whilst in said laminar flow.

9. A method as claimed in Claim 8, wherein a plurality of operatives at a plurality of work stations disposed at intervals along the path of flow manipulate powder into respective containers.

10. A method for the aseptic creation of solution in containers comprising carrying out a method as claimed in Claim 8 or Claim 9 and, whilst the container is still within the laminar flow of gaseous environment, adding a solute to powder in the container.

11. A structure for creating a laminar-flow environment substantially as described herein with reference to the accompanying drawings.

12. A method for the aseptic insertion of powder into a container substantially as described herein with reference to the accompanying drawings.

13. A method for the aseptic creation of solution in containers substantially as described herein with reference to the accompanying drawings.

Published 1989 at The Patent Office, State House, 66-71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office. Sales Branch, St Mary Cray, Orpington, Kent BR5 3RD. Printed by Multiplex techniques ltd, St Mary Cray, Kent, Con. 1/87